wwPDB X-ray Structure Validation Summary Report (i)

Mar 24, 2022 – 12:28 pm GMT

PDB ID	:	6FAD
Title	:	SR protein kinase 1 (SRPK1) in complex with the RGG-box of HSV1 ICP27
Authors	:	Tunnicliffe, R.B.; Levy, C.; Mould, A.P.; Mckenzie, E.A.; Sandri-Goldin, R.M.; Golovanov, A.P.
Deposited on	:	2017-12-15
Resolution	:	2.80 Å(reported)

This is a wwPDB X-ray Structure Validation Summary Report for a publicly released PDB entry.

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/XrayValidationReportHelp
with specific help available everywhere you see the (i) symbol.

The following versions of software and data (see references (i)) were used in the production of this report:

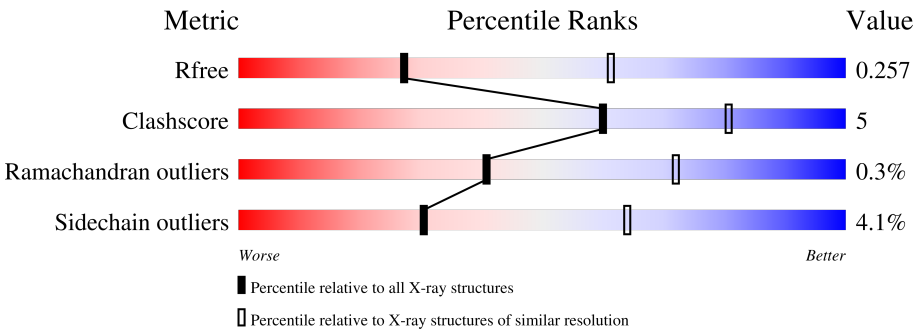
MolProbity	:	4.02b-467
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.27
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0267
CCP4	:	7.1.010 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.27

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 2.80 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	3140 (2.80-2.80)
Clashscore	141614	3569 (2.80-2.80)
Ramachandran outliers	138981	3498 (2.80-2.80)
Sidechain outliers	138945	3500 (2.80-2.80)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=5%

Mol	Chain	Length	Quality of chain
1	A	618	50% 7% 42%
1	B	618	50% 8% 42%
1	C	618	47% 10% • 42%
1	D	618	50% 7% 42%
2	E	16	56% 19% 25%
2	F	16	31% 6% 6% 56%
2	G	16	38% 6% 6% 50%

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Mol	Chain	Length	Quality of chain
2	H	16	44% 6% 50%

2 Entry composition (i)

There are 4 unique types of molecules in this entry. The entry contains 12099 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called SRSF protein kinase 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	356	2892	1868	493	519	12	0	0	0
1	B	356	2892	1868	493	519	12	0	0	0
1	C	359	2915	1883	497	523	12	0	0	0
1	D	356	2892	1868	493	519	12	0	0	0

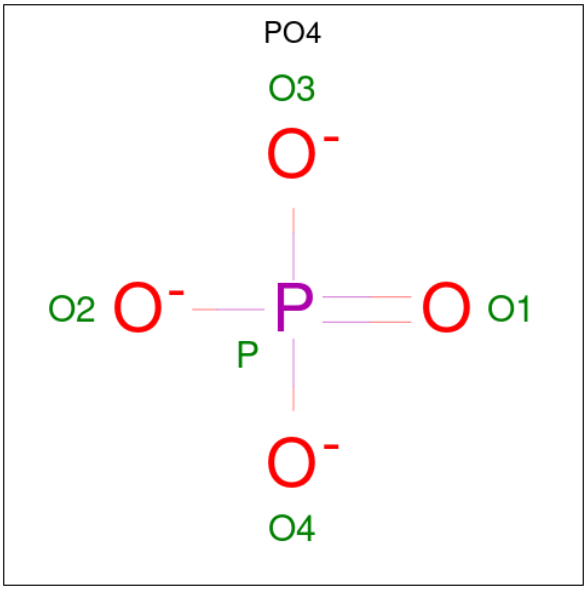
There are 16 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	38	GLY	-	expression tag	UNP Q96SB4
A	39	SER	-	expression tag	UNP Q96SB4
A	40	HIS	-	expression tag	UNP Q96SB4
A	41	MET	-	expression tag	UNP Q96SB4
B	38	GLY	-	expression tag	UNP Q96SB4
B	39	SER	-	expression tag	UNP Q96SB4
B	40	HIS	-	expression tag	UNP Q96SB4
B	41	MET	-	expression tag	UNP Q96SB4
C	38	GLY	-	expression tag	UNP Q96SB4
C	39	SER	-	expression tag	UNP Q96SB4
C	40	HIS	-	expression tag	UNP Q96SB4
C	41	MET	-	expression tag	UNP Q96SB4
D	38	GLY	-	expression tag	UNP Q96SB4
D	39	SER	-	expression tag	UNP Q96SB4
D	40	HIS	-	expression tag	UNP Q96SB4
D	41	MET	-	expression tag	UNP Q96SB4

- Molecule 2 is a protein called mRNA export factor.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
2	E	12	97	52	33	12	0	0	0
2	F	7	63	34	22	7	0	0	0
2	G	8	67	36	23	8	0	0	0
2	H	8	67	36	23	8	0	0	0

- Molecule 3 is PHOSPHATE ION (three-letter code: PO4) (formula: O_4P).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	O	P		
3	A	1	5	4	1	0	0
3	A	1	5	4	1	0	0
3	B	1	5	4	1	0	0
3	B	1	5	4	1	0	0
3	C	1	5	4	1	0	0

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
4	A	43	43	43	0	0

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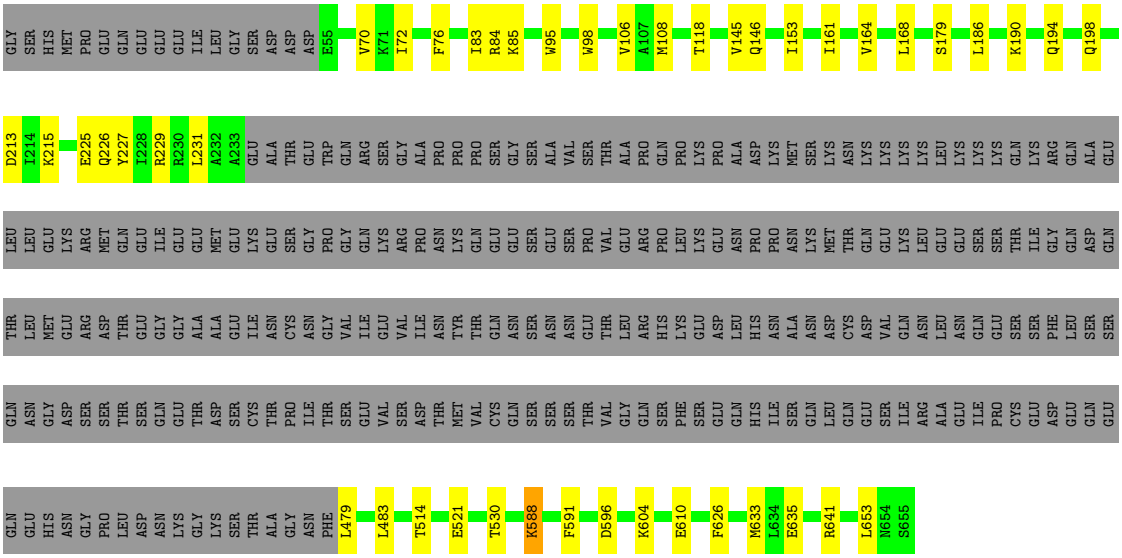
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
4	B	53	53	53	0	0
			Total	O		
4	C	29	29	29	0	0
			Total	O		
4	D	60	60	60	0	0
			Total	O		
4	E	2	2	2	0	0
			Total	O		
4	H	2	2	2	0	0

3 Residue-property plots (i)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

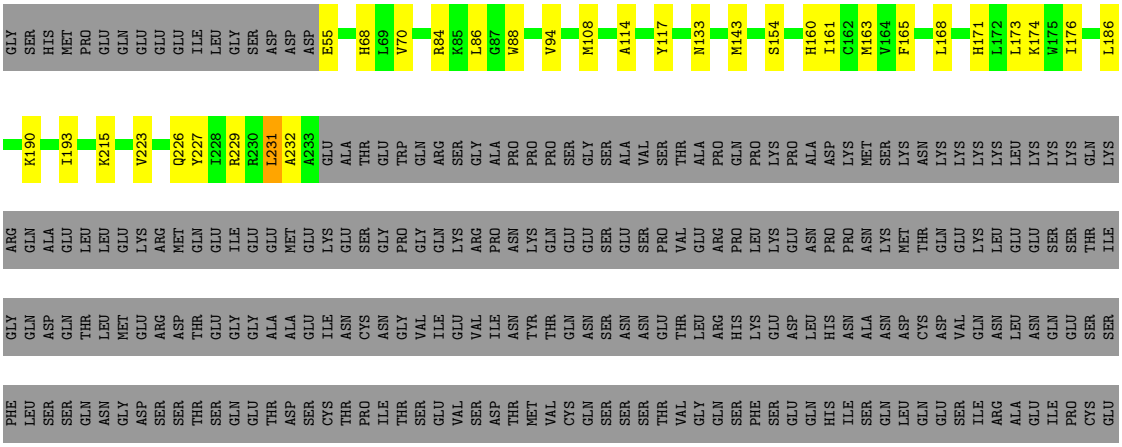
- Molecule 1: SRSF protein kinase 1

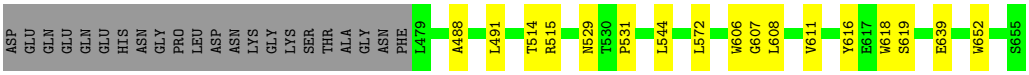
Chain A:



- Molecule 1: SRSF protein kinase 1

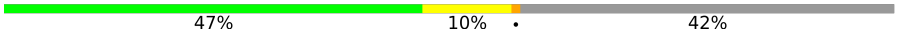
Chain B:

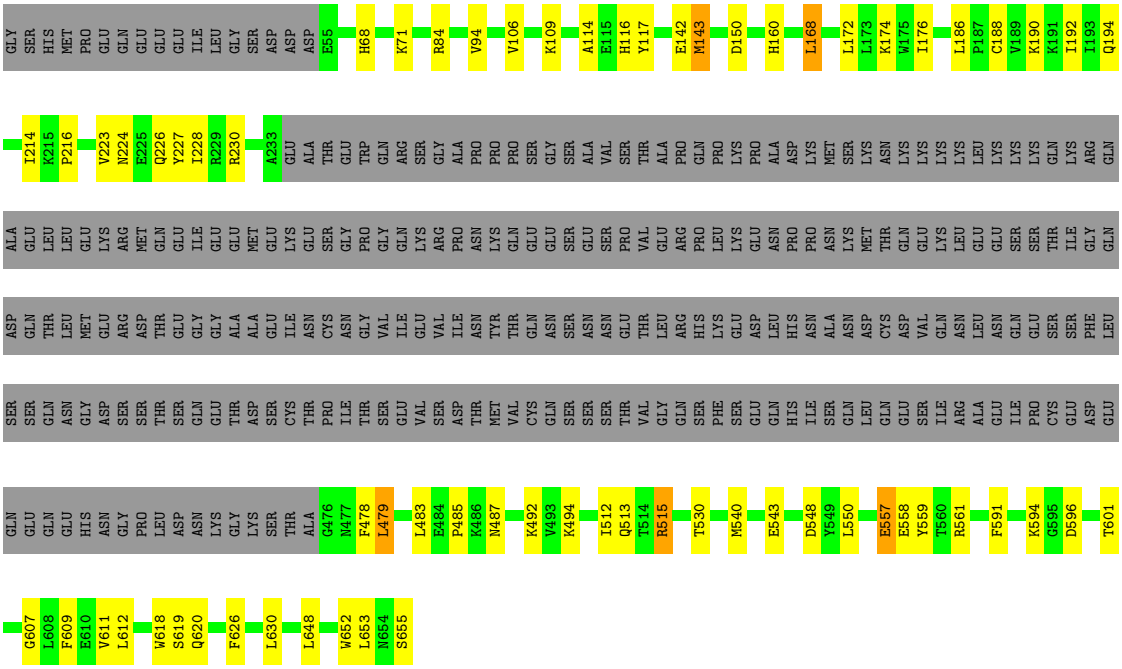




• Molecule 1: SRSF protein kinase 1

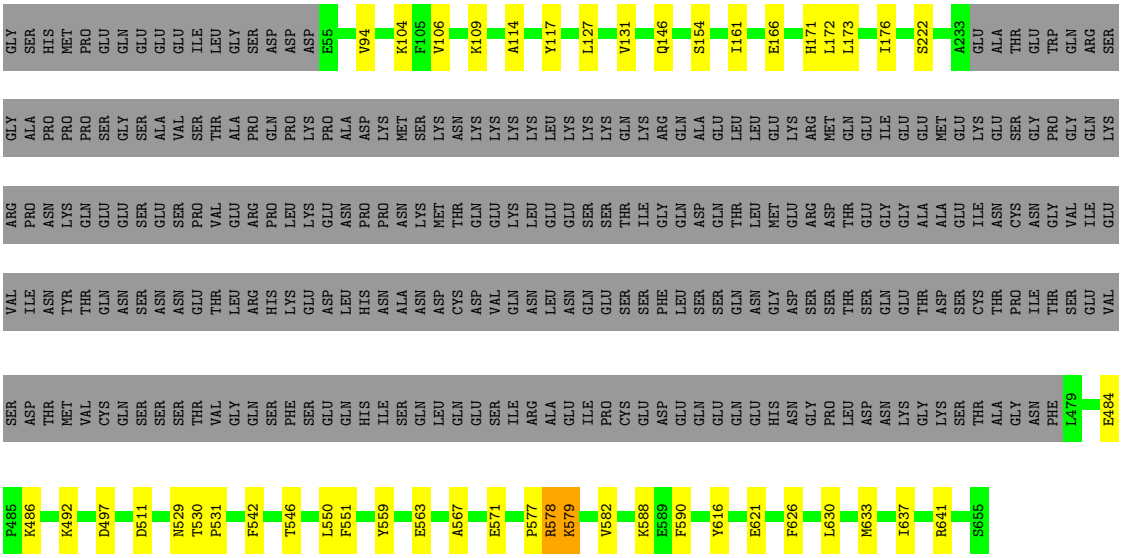
Chain C:





• Molecule 1: SRSF protein kinase 1

Chain D:

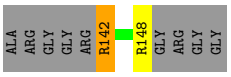


• Molecule 2: mRNA export factor

Chain E: 56% 19% 25%

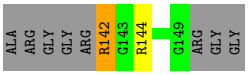
• Molecule 2: mRNA export factor

Chain F: 31% 6% 6% 56%



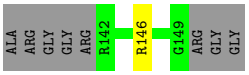
• Molecule 2: mRNA export factor

Chain G: 38% 6% 6% 50%



• Molecule 2: mRNA export factor

Chain H: 44% 6% 50%



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 32 1 2	Depositor
Cell constants a, b, c, α, β, γ	99.98Å 99.98Å 426.05Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	80.21 – 2.80 142.02 – 2.80	Depositor EDS
% Data completeness (in resolution range)	100.0 (80.21-2.80) 100.0 (142.02-2.80)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.40 (at 2.82Å)	Xtriage
Refinement program	PHENIX (1.12_2829: ???)	Depositor
R, R_{free}	0.198 , 0.257 0.199 , 0.257	Depositor DCC
R_{free} test set	2994 reflections (4.93%)	wwPDB-VP
Wilson B-factor (Å^2)	25.3	Xtriage
Anisotropy	0.720	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	(Not available) , (Not available)	EDS
L-test for twinning[2]	$< \|L\| > = 0.51$, $< L^2 > = 0.34$	Xtriage
Estimated twinning fraction	0.028 for -h,-k,l	Xtriage
F_o,F_c correlation	0.90	EDS
Total number of atoms	12099	wwPDB-VP
Average B, all atoms (Å^2)	41.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.61% of the height of the origin peak. No significant pseudotranslation is detected.*

[1]Intensities estimated from amplitudes.

[2]Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality (i)

5.1 Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: PO4

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\#\|Z\| >5$	RMSZ	$\#\|Z\| >5$
1	A	0.44	0/2964	0.59	0/4012
1	B	0.41	0/2964	0.58	0/4012
1	C	0.41	0/2988	0.58	0/4044
1	D	0.42	0/2964	0.58	0/4012
2	E	0.44	0/96	0.70	0/120
2	F	0.43	0/62	0.61	0/77
2	G	0.38	0/66	0.60	0/82
2	H	0.51	0/66	0.69	0/82
All	All	0.42	0/12170	0.58	0/16441

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts (i)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2892	0	2905	25	0
1	B	2892	0	2904	27	0
1	C	2915	0	2921	34	0
1	D	2892	0	2905	24	0
2	E	97	0	105	3	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	F	63	0	70	1	0
2	G	67	0	73	2	0
2	H	67	0	73	0	0
3	A	10	0	0	0	0
3	B	10	0	0	1	0
3	C	5	0	0	0	0
4	A	43	0	0	0	0
4	B	53	0	0	1	0
4	C	29	0	0	0	0
4	D	60	0	0	0	0
4	E	2	0	0	0	0
4	H	2	0	0	0	0
All	All	12099	0	11956	110	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 5.

The worst 5 of 110 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:84:ARG:HH22	1:B:231:LEU:HG	1.45	0.82
1:C:557:GLU:HG2	1:C:558:GLU:HG2	1.66	0.78
1:B:55:GLU:N	4:B:801:HOH:O	2.23	0.69
1:C:94:VAL:HG22	1:C:109:LYS:HG3	1.79	0.65
1:B:84:ARG:NH2	1:B:231:LEU:HG	2.10	0.65

There are no symmetry-related clashes.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	352/618 (57%)	334 (95%)	18 (5%)	0	100	100
1	B	352/618 (57%)	339 (96%)	10 (3%)	3 (1%)	17	46
1	C	355/618 (57%)	339 (96%)	15 (4%)	1 (0%)	41	72
1	D	352/618 (57%)	336 (96%)	15 (4%)	1 (0%)	41	72
2	E	10/16 (62%)	8 (80%)	2 (20%)	0	100	100
2	F	5/16 (31%)	5 (100%)	0	0	100	100
2	G	6/16 (38%)	5 (83%)	1 (17%)	0	100	100
2	H	6/16 (38%)	5 (83%)	1 (17%)	0	100	100
All	All	1438/2536 (57%)	1371 (95%)	62 (4%)	5 (0%)	41	72

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	232	ALA
1	B	606	TRP
1	B	515	ARG
1	C	515	ARG
1	D	497	ASP

5.3.2 Protein sidechains (i)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	315/551 (57%)	305 (97%)	10 (3%)	39	73
1	B	315/551 (57%)	305 (97%)	10 (3%)	39	73
1	C	317/551 (58%)	298 (94%)	19 (6%)	19	48
1	D	315/551 (57%)	305 (97%)	10 (3%)	39	73
2	E	7/8 (88%)	7 (100%)	0	100	100
2	F	5/8 (62%)	3 (60%)	2 (40%)	0	0
2	G	5/8 (62%)	4 (80%)	1 (20%)	1	4
2	H	5/8 (62%)	4 (80%)	1 (20%)	1	4

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
All	All	1284/2236 (57%)	1231 (96%)	53 (4%)	30 64

5 of 53 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	186	LEU
1	C	530	THR
2	F	142	ARG
1	C	223	VAL
1	C	478	PHE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	160	HIS

5.3.3 RNA (i)

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains (i)

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates (i)

There are no monosaccharides in this entry.

5.6 Ligand geometry (i)

5 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
3	PO4	A	701	-	4,4,4	0.79	0	6,6,6	1.03	1 (16%)
3	PO4	B	701	-	4,4,4	0.87	0	6,6,6	0.72	0
3	PO4	A	702	-	4,4,4	0.96	0	6,6,6	0.82	0
3	PO4	C	701	1	4,4,4	0.69	0	6,6,6	0.91	0
3	PO4	B	702	1	4,4,4	0.73	0	6,6,6	0.62	0

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	A	701	PO4	O4-P-O3	2.04	114.53	107.97

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	B	702	PO4	1	0

5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

6 Fit of model and data (i)

6.1 Protein, DNA and RNA chains (i)

Unable to reproduce the depositors R factor - this section is therefore empty.

6.2 Non-standard residues in protein, DNA, RNA chains (i)

Unable to reproduce the depositors R factor - this section is therefore empty.

6.3 Carbohydrates (i)

Unable to reproduce the depositors R factor - this section is therefore empty.

6.4 Ligands (i)

Unable to reproduce the depositors R factor - this section is therefore empty.

6.5 Other polymers (i)

Unable to reproduce the depositors R factor - this section is therefore empty.